

## Math F113X: Homework Set 4

Answer the following problems from the Fair Division section:

6, A, 8, B, 11, 14, 16

Note: It will be easier on the grader and on YOU if you do the problems in the order listed.

**Problem A:** Two people, Aeden (A) and Beyoncé (B), are splitting a box of 6 labubu toys from the Macaron Series worth \$400. The chart below shows how each person values each toy, given in dollars.

	Labubu Toy					
	Soymilk (S)	Lychee (L)	Grape (G)	Coconut (C)	Toffee (T)	Sesame Bean (SB)
Aeden	100	100	50	50	50	50
Beyoncé	100	80	80	80	40	20

1. Divide the box of toys using Divider-Chooser with Aeden as the Divider and Beyoncé as the Chooser. Indicate the final assignment of toys to people and the relative values of each share.
2. Divide the box of toys using Divider-Chooser with Beyoncé as the Divider and Aeden as the Chooser. Indicate the final assignment of toys to people and the relative values of each share.

**Problem B:** Three people, Aimee (A), Benito (B), and Cicely (C), are dividing a piece of land using the lone-divider method. The values of the three pieces of land in the eyes of each player are shown below.

	piece 1	piece 2	piece 3
A	30%	30%	40%
B	25%	25%	50%
C	33.3%	33.3%	33.3%

1. Who was the divider and how can you tell?
2. Explain what happens in the next step of the lone-divider method and why?
3. Suppose Cicely takes piece 1. What is the remaining land to Aimee and Benito?
4. Suppose Aimee and Benito split the combined land using the Divider-Chooser method what is the minimum share of the original land each would receive? Would it be fair?

Remember to write up your homework solutions according to the homework writeup guidelines.

Homework is graded using the following rubric for each problem (or problem part):

**2 points:** You provided a complete answer, with supporting work, written up clearly

**1 point:** Some attempt at a solution, but incomplete writeup / unclear / illegible / no answer

**1 point:** Only an answer, with no supporting work

**0 points:** Missing.

After you do the homework, you need to check your answers against the solutions! Then figure out your errors (if any) and revise your homework before you submit it. Finally, answer the reflection question.

Homework must be submitted on Gradescope.